CLAIMS

WE CLAIM:

1. A preamplifier for processing read head signals to correct for thermal asperity transients, comprising:

an input gain stage receiving a read head signal from the read head;

a correction circuit connected to the input gain stage comprising a filter controller detecting a thermal asperity transient in the read head signal and generating a control signal based on the detecting and further comprising a filter operating dynamically based on the control signal to at least partially filter the detected thermal asperity transient from the read head signal to produce a filtered read head signal; and

a reader output buffer receiving and transmitting the filtered read head signal.

2. The preamplifier of claim 1, wherein the filter is connected in series with the input gain stage and the reader output buffer.

3. The preamplifier of claim 1, wherein the filter comprises a voltage controlled high pass filter and wherein the control signal comprises a voltage signal.

4. The preamplifier of claim 3, wherein the filter controller receives as an input signal an output voltage of the voltage controlled high pass filter or an input voltage of the voltage controlled high pass filter.

5. The preamplifier of claim 4, wherein the filter controller comprises a detector for identifying peaks in the input signal.

6. The preamplifier of claim 5, wherein the detector comprises a low pass filter.

7. The preamplifier of claim 5, wherein the filter controller further comprises a non-linear function generator and wherein an output of the detector is applied to the non-linear function generator to generate the control signal for the filter.

8. The preamplifier of claim 7, wherein the non-linear function generator is adapted to produce an increasing function of an absolute value of the output of the detector.

9. The preamplifier of claim 8, wherein the non-linear function generator comprises $(|V_{IN}|/V_C)^4$ or $e^{|V_{IN}|/V_C}$ wherein V_{IN} is the output of the detector and V_C is a control coefficient.

10. A method for dynamic correction of thermal asperity transients in magneto resistive (MR) read head output signals, comprising:

receiving an output signal from an MR read head;

processing the MR read head output signal through a gain stage to generate a filter input signal;

detecting a peak in the filter input signal, the peak indicating a thermal asperity transient in the MR read head output signal;

generating a control signal based on the peak detecting; and

filtering the filter input signal based on the control signal to produce a filtered MR read head signal.

11. The method of claim 10, wherein the filtering comprises applying a voltage controlled high pass filter to the filter input signal, the high pass filter operating dynamically based on the control signal.

12. The method of claim 10, wherein the detecting comprises applying the filter input signal to a low pass filter.

13. The method of claim 12, wherein the control signal generating comprises applying an output of the low pass filter to a non-linear function generator to generate an increasing function of an absolute value of the output of the low pass filter.

14. The method of claim 13, wherein the non-linear function generator comprises $(|V_{IN}|/V_C)^4$ or $e^{|V_{IN}|/V_C}$ wherein V_{IN} is the output of the detector and V_C is a control coefficient.

15. The method of claim 10, wherein the filtering comprises removing low frequency components of the detected thermal asperity transient in the MR read head output signal.

16. A disk drive assembly with thermal asperity transient correction, comprising:

a read head generating a read head signal based on reading data from a disk, the read head signal comprising a thermal asperity transient;

a preamplifier connected to the read head processing the read head signal to generate a filtered read head signal, wherein the preamplifier comprising a reader input gain stage, a reader output buffer, and a correction circuit positioned between the reader input gain stage and the reader output buffer, the correction circuit adapted for detecting and at least partially filtering the thermal asperity transient from the read head signal; and

a read channel for processing the filtered read head signal to identify the read data.

17. The assembly of claim 16, wherein the correction circuit comprises a filter controller for detecting the thermal asperity transient and in response, generating a control signal and further comprises a voltage controlled high pass filter adapted to operate dynamically to perform the filtering of the thermal asperity transient based on the control signal.

18. The assembly of claim 17, wherein input to the filter controller is an output voltage of the voltage controlled high pass filter or is an input voltage of the voltage controlled high pass filter.

19. The assembly of claim 18, wherein the filter controller comprises a low pass filter adapted for detecting peaks in the filter controller input.

20. The assembly of claim 19, wherein the filter controller further comprises a non-linear function generator for producing the control signal based on an increasing function of an absolute value of the output of the low pass filter.

21. The assembly of claim 20, wherein the non-linear function generator comprises $(|V_{IN}|/V_C)^4$ or $e^{|V_{IN}|/V_C}$ wherein V_{IN} is the output of the detector and V_C is a control coefficient.

22. A preamplifier for use with a magneto resistive (MR) read head to correct for thermal asperity transients in output signals of the MR read head, comprising:

an input gain device receiving an output signal from the MR read head;

an output buffer device outputting a reader output signal to a read channel;

a high pass filter positioned between the input gain device and the output buffer device, the high pass filter being adapted for dynamic filtering of an output of the input gain device based on an input voltage control signal; and

a filter controller comprising a low pass filter adapted for detecting peaks in the output of the input gain device or an output voltage of the high pass filter and further comprising a non-linear function generator generating the voltage control signal based on an output of the low pass filter.

23. The preamplifier of claim 22, wherein the non-linear function generator generates the voltage control signal as an increasing function of an absolute value of the output of the low pass filter.